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Population Increase and Food Production in Tropical Africa

By Robert W. Steel
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IN CONTRAST to some of the other papers presented for discussion at this Conference, I do not intend to speak particularly of studies by geographers, or even of studies in general, of the relationships between population increase and food production in tropical Africa, nor do I want to try to review such literature as is available on the subject. Instead, I want to focus attention on a related group of problems to which so far, in my view, inadequate attention has been given, and to suggest a number of questions. I hope in this way to initiate a discussion that can draw on the widely varied experience represented in this Conference, in terms of areas, disciplines and points of view.

We must start with some of the basic facts of world population increase. Not until 1830 did world population reach the 1,000 million mark. By 1930, that total had doubled; by about 1970 it will have doubled again; and the United Nations population experts forecast a world total of 6,250 millions by the year 2,000.

Human fertility today is largely unchecked in many parts of the world, while death control—through new drugs, insecticides, famine relief, and in many other ways—is adding to this very considerable increase of population. How far are food and other resources being developed, to maintain a balance between the food supplies available and the mouths to be fed? What is the relationship between population increase and food production in a world of more than 3,000 million people, of whom it is said that perhaps 500 millions suffer from hunger and 1,000 millions in addition are under-nourished? What are the future prospects in a world where the really high birth-rates (with population increases of 3% or more per annum) are mostly in poverty-striken countries where illiteracy is high—many of these being underdeveloped or developing countries within the tropics?

These are questions that we rightly ask when we look at the global picture. How far are they applicable to tropical Africa? Tropical Africa, with a total population of at least 180 millions, is clearly not in the front rank of population-problem areas, compared with (say) parts of monsoon Asia. But equally clearly we cannot ignore these questions of population/food relationships in a continent where death control is becoming increasingly marked, where birth rates are often high and sometimes very high, and where there is plenty of evidence of the world-wide tendency towards urbanization. Acute problems may not be cropping up everywhere, but perhaps in many areas they are not very far away. They certainly merit close attention and intelligent study.

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Twelve years ago the late Sir Philip Mitchell, then Governor of Kenya, wrote the long despatch[1] that culminated in the setting-up of the East Africa Royal Commission of 1953-55. He quoted from a District Commissioner's report that had been cited by the Kenya Land Commission :

> " The future of the next thirty years or so may be imagined as a race between the tendency of a growing population to congest the land and a growing skill to make the same land support a larger population . . . It seems likely that in about twenty years from now (unless remedial measures are taken), approaching congestion will decrease the standard of life, as much as skill will raise it." He commented : " More recent evidence shows that the forebodings of the District Commissioner were not far wide of the mark, in spite of the great and continuously expanding efforts that have been made to combat soil erosion and loss of fertility, to improve the agricultural methods of the African peasant and to win his confidence " (pp. 2-3). There follows his often quoted remark (p. 3), " . . . it is clear that most East African tribes are increasing rapidly in numbers, and the best available evidence seems to point to an annual increase which may amount to 2 per cent in the most favourable areas."

Subsequently the Royal Commission studied the population question in considerable detail.[2] It was pointed out that very often those who quoted Sir Philip Mitchell's figure of an annual rate of increase of two per cent failed to add the important proviso " in the most favourable areas ". The general conclusion of the Commission was in line with that of J. E. Goldthorpe's memorandum on the African population of East Africa[3] : " In our opinion there is no evidence to suggest that up to the present the general rate of growth of the African population has exceeded the overall ability of the economy of the three territories to support it " (p. 34). Later they emphasize—in words that perhaps have an applicability throughout tropical Africa and which most effectively summarize the facts of the situation with which geographers are constantly concerned—the uneven distribution of population and the very unequal distribution of resources : " We were impressed by the recurring evidence that particular areas were now carrying so large a population that agricultural production in them was being retarded, that the natural resources themselves were being destroyed, that families were unable to find access to new land, and that land which should have been lying fallow was being encroached upon . . . Too large a proportion is still

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[1] *Land and Population in East Africa* (1952), Col. No. 290, p. 2.
[2] *East African Royal Commission 1953-1955 Report* (1955), Cmd. 9475, Chap. 3, pp. 34 - 40.
[3] *Ibid.*, Appendix VII, pp. 462 - 73.

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engaged in subsistence food production " (p. 37). Often, it was suggested, 60 per cent or more of the people was engaged in producing the food needed to feed the population (the comparative figure, in economically advanced countries is generally between 12 and 15 per cent).

Points in the East African Royal Commission Report have been quoted at length because they highlight several features of the population/land relationship with which all of us are, or ought to be, much concerned. Too often we let ourselves become diverted by arguments about, for example, the unreliability of the statistics available. Probably none of us believes that there are really 55 million people in Nigeria, as the latest census suggests, but increases elsewhere seem well substantiated—the increase in Ghana, for example, from 4.1 millions in 1948 to 6.7 millions in 1960 (with a further increase of 1.4 millions, or 19.7 per cent, in the period covered by the Seven-Year Development Plan)[4] : or the Tanganyika increase of 17 per cent between 1948 and 1957 (1.75 per cent per annum), from 7.4 to 8.7 millions. We must not allow ourselves to be too easily consoled by analyses such as those carried out by the East African Commissioners. The fact is, surely, that population increases are taking place at a very considerable rate in many parts of tropical Africa today. Even where there is considerable regional variation, the totals for many countries seem likely to double within thirty or forty years. More mouths to feed mean that more food needs to be produced or to be imported ; and even if there were no necessity for quantities to be increased, there is an urgent need for the *quality* of the food supply to be improved, for dietetic and nutritional reasons.

There is, however, another and a very different point of view about population in tropical Africa that it would be wrong to ignore in our discussions, namely, the thesis that Africa as a continent, far from experiencing overpopulation or even overcrowding, actually suffers from underpopulation. Those subscribing to this view argue—with considerable justification—that, were there more people, there could be more effective land use, more economic development and greater material prosperity. They point to the high degree of population mobility in many parts of Africa and to the extent of the movement of peoples into areas like Rhodesia, Kenya and some of the coastal areas of western Africa.[5] For the present discussion it is admissible, perhaps, to suggest that tropical Africa covers a very extensive area with a great

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[4] *Ghana Seven-Year Development Plan,* 1963/64 to 1969/70 (Office of the Planning Commission, Accra, 1964), p. 54. The 1948 figure is, in the view of some, an underestimate of the population.

[5] For the variety of population situations in Africa, see K. M. Barbour and R. M. Prothero (editors) (1961), *Esays on African Population.* For a general study of movements of population in Africa, see R. M. Prothero, " Continuity and Change in African Population Mobility " in R. W. Steel and R. M. Prothero (editors), *Geographers and the Tropics : Liverpool Essays,* (1964), pp. 189 - 213.

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regional variety and that, while there are undoubtedly some parts that could support considerably larger populations, there are also areas—large and small—where, under existing agricultural methods and in the current stage of economic development, there are indications of pressure of population upon the resources of the land, in the future if not already present today.

On the nature and amount of the food supplies available, there is as unreliable and as incomplete statistical and other information available as there is for population. Many of the standard books, such as Lord Hailey's *An African Survey* (revised, 1957), largely ignore the subject, though E. B. Worthington's *Science in the Development of Africa* (1958) has much that is relevant to any discussion of the subject. P. de Schlippe's *Shifting Cultivation in Africa* (1956) is perhaps misleading in its title in that it is wholly concerned with the Azande people of the Congo/Sudan border, and important books that deal with agriculture, including food crops, often have surprisingly little to say about food supplies as such.[6]

Often we have to fall back on detailed surveys of small communities, such as the Fortes' account of the Tallensi in northern Ghana many years ago,[7] or Audrey Richards' study of the Bemba, in *Land, Labour and Diet in Northern Rhodesia* (1938).[8] The only comprehensive treatise for a whole country, apart from H. P. White's short paper on Ghana,[9] is D. N. McMaster's *A Subsistence Crop Geography of Uganda* (1962). Using ecological, land-use and statistical approaches to the study of subsistence agriculture, McMaster succeeds in mapping the distribution of various crops and in establishing the limits of close cultivation, analysing the contemporary pattern of African subsistence crop production in its physical and human setting. This is a particularly important study in an agricultural country " where the impact of cash crops is increasingly modifying the rural scene, and where the forces of population increase and urban growth, with consequent alterations in food demands, will bring greater changes in the future " (p. ix). Another notable work is Bruce F. Johnston's *The Staple Food Economies of Western Tropical Africa* (Food Research Institute, Stanford University, 1958), and it is significant that the collection of essays in *Markets in Africa* (edited by P. Bohannan and

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[6] e.g. J. D. Tothill (ed.) (1940), *Agriculture in Uganda;* J. D. Tothill (ed.) (1948), *Agriculture in the Sudan;* J. P. Moffett (ed.) (1958), *Tanganyika: a Review of its Resources and their Development;* J. B. Wills (ed.) (1962), *Agriculture and Land Use in Ghana.*

[7] M. Fortes and S. Fortes (1936), " Food in the Domestic Economy of the Tallensi ", *Africa,* 9, pp. 237 - 76.

[8] See also A. I. Richards (1958), " A Changing Pattern of Agriculture in East Africa : the Bemba of Northern Rhodesia ", *Geographical Journal,* 124, pp. 302 - 14.

[9] H. P. White (1956), " Some Aspects of Food Crop Production in the Gold Coast ", in L. D. Stamp (ed.), *Natural Resources, Food and Population in Inter-tropical Africa: Report of a Symposium,* pp. 37 - 42.

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G. Dalton, 1962) lays considerable emphasis on the considerable exchange of foodstuffs in markets throughout the continent.

For any quantitative assessment of the general situation relating to food supplies, we must generally fall back on the statistics collected by or supplied to F.A.O. or produced in Government reports, and it is well-known that such figures are, as often as not, mere guesses and not always particularly intelligent ones at that. There are, however, exceptions to this common lack of study, and Uganda again provides an example of work done. A notable paper by A. S. MacDonald (1963)[10] studies food production in Uganda in relation to the population of the country, which increased by 1.5 millions between 1948 and 1959, a growth rate of 2.5 per cent per annum. The author suggests that at present there is considerable overproduction of food, and he believes that, with food likely to assume increased importance during the next twenty years, it might become " a valuable and increasingly exportable product " (p. 155). But if Uganda is to increase her share of the world's food market more attention must be given to land utilization, to husbandry standards and to marketing studies. What MacDonald's careful study suggests in fact is that there is considerable variation in African conditions, in the production of food as in the distribution and growth of population. Some areas produce food surpluses, while other parts have inadequate supplies and need to import, where possible, from more productive ones. Generalization is difficult and dangerous, though certain facts are incontrovertible.

It is clear, for example, that there are very real shortages of food in many parts of tropical Africa, and these are not by any means always in those countries with overall densities of population higher than the average for the continent as a whole. A study of the annual Government reports of a country like Tanganyika reveals recurrent references to drought, locust invasions, food shortages, famines and malnutrition. The background to the African Land Husbandry Act in Southern Rhodesia (now Rhodesia) and to the African Farming Improvement Scheme in Northern Rhodesia (now Zambia) lay in the regular inadequacy of the supply of maize and other foodstuffs for populations that even today barely exceed 6 millions in the two countries. The Swynnerton Plan for Kenya[11] was based on a realization that better forms of land usage were urgently needed to help solve some of the country's great socio-economic problems. Even in Ghana, agriculture has not been able on the basis of traditional farming methods " to keep up with the growing domestic demand for food in recent years and local food prices have risen steadily, while a part of the demand for food has been met by increased imports " ; according to the Seven-Year Development Plan,[12] even

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[10] " Some Aspects of Land Utilization in Uganda ", *East African Agricultural and Forestry Journal,* 29, pp. 147 - 56.

[11] R. J. M. Swynnerton (1954), *A Plan to Intensify the Development of African Agriculture in Kenya* (Nairobi).

[12] *Seven-Year Development Plan,* p. 55.

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though domestic food production accounted in 1962 for £G181 m. or almost exactly one-third of the gross domestic product of Ghana.

The demand for food is increasing everywhere, if only because population is increasing, often at a very rapid rate. More and more people are becoming town-dwellers and, therefore, potential purchasers of food rather than producers of it. Governments generally are seeking to raise living standards : this usually means at least as much food is needed per head of population as now, and in most cases calls for larger, and better, supplies. We may well wonder, even in the absence of statistical proof, whether food production is keeping pace with such an increase in demand and, in particular, whether food is available in the places where the needs are greatest. The position in Ghana may be more acute than in most other parts of tropical Africa, particularly in that country's southern, more developed parts, with the large-scale development of cocoa-farming and of mining and not inconsiderable industrialization and urbanization. But Ghana may well be an indication of the shape of things to come over much of Africa. E. B. Worthington put his finger on the nature of the problem when he wrote (in 1958) of the gathering momentum of the increase in the human population of Africa south of the Sahara. He compared the present expectation of life in Africa (about 30 years) with the 60 common in parts of Europe. " If success is achieved in bringing the resources of modern knowledge to bear, the expectation of life, that is the survival rate at all ages but especially in infancy, will double itself. The wide open spaces will soon be filled."[13] Later he expressed the view that " the first broad aim of development, indeed the fundamental problem, must be to cause production to increase at a greater rate than population until such time as the population becomes reasonably stable."[14]

Should we, as students of African affairs, be concerned with the situation that may be developing in many parts of tropical Africa ? Should Governments be taking more active steps to deal with the possible deterioration of the food supply position ? Or is the position overstated and are people justified in reckoning that the population/food relationship in the future is unlikely to be any worse—and may even be considerably better—than it has been hitherto ? Was Sir Philip Mitchell being a scaremonger in 1952 ? Did he exaggerate the position in order to strengthen his case for the establishment of a Royal Commission, not only for Kenya, but for its East African neighbours as well ? When I published a paper in 1948 suggesting that in parts of West Africa there was increasing evidence of pressure of population upon land resources,[15] I was thought to be unduly pessimistic about the prospects of increasing food supplies and improving their distribution and

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[13] E. B. Worthington (1958), *Science in the Development of Africa*, p. 18.

[14] *Ibid.*, p. 19.

[15] R. W. Steel (1949), " Some Geographical Problems of Land Use in British West Africa ", *Transactions and Papers, 1948, Institute of British Geographers*, pp. 27 - 42.

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marketing. Ten years later when I talked to the Oxford Overseas Service Summer School and pleaded for what I termed " an inventory of land and people,"[16] several of my listeners with long African experience told me courteously but firmly that an assessment of natural and human resources was both unnecessary and impossible. I still beg to differ and to maintain my original point of view. We *must* discover and record all the information that we can.

We must remember, too, that it is not merely a question of increased quantities—of, for example, starchy food—that are needed to feed increased numbers of mouths. There are also important health and nutritional considerations that call for an improvement in the quality of the diet and a considerable diversification of the type of foodstuffs produced. Without elaborating this side of the topic in this paper, perhaps attention may be drawn to the very widespread distribution of important nutritional diseases over most of tropical Africa. G. H. T. Kimble's summary generalizations on the matter are also worth bearing in mind in our discussions. His six points are :[17]

> 1. Over much of tropical Africa food supplies are irregular in amount and critically low during the " hungry season ", the months immediately preceding the harvest.
> 2. The total annual caloric intake of food over most of the same area does not meet minimum health standards as set down by such bodies as the Food and Agriculture Organization of the United Nations.
> 3. Important nutritional elements are lacking, for some or all of the time, from the diet of most Africans.
> 4. The prevalence of these dietary deficiencies is a major cause of prenatal and infant mortality and degenerative diseases in children and adults of all ages.
> 5. Where these deficiencies are chronic, they result in the stunting of growth processes and consequently in the lifelong impairment of physical and mental powers.
> 6. Even where diets may appear adequate by F.A.O. standards, they may not in fact be so, on account of liver disease, worm infestations, or through other intestinal diseases which interfere with absorption or storage.

Anyone familiar with tropical Africa knows something of the background of food production : the generally wasteful methods of farming the extravagant use—and sometimes misuse—of land, the quite considerable productivity of

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[16] R. W. Steel (1960), " An Inventory of Land and People ", *Journal of African Administration,* 12, pp. 211 - 23.

[17] G. H. T. Kimble (1960), *Tropical Africa,* vol. ii, pp. 41 - 2.

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certain, generally restricted areas ; and the vast, uncultivated and otherwise unused areas, some no doubt potentially good cultivable or pastoral land, others of no use whatsoever unless supplied with more water, better drainage or large quantities of fertilizer. Much is known too of the waste—the foodstuffs that remain unharvested in some districts, the losses caused by faulty storage and by the inadequacy of the marketing and transport organization. But it is not just a question of more or better organization, an adjustment of land tenure arrangements, the provision of more roads, or the establishment of co-operative marketing. There are the lessons of Kongwa, Mokwa and many other schemes that somehow went wrong, despite the good intentions of those responsible, and notwithstanding very considerable capital investment and a fair amount of technical competence and experience. " A varied and on the whole a harsh environment ", the Royal Commission's terse description of many of the physical conditions of East Africa,[18] can be equally applied to many other parts of tropical Africa : so too can the *Report's* rider, that " this discouraging background brings into relief the overriding importance of proper use being made of the limited areas of high productivity."

There are many ways by which productivity can be increased through the improvement and intensification of farming activities. Later discussion may bring out the special relevance of some ways and emphasize the limitations of others ; it may also suggest the relative significance of these various ways under the quite highly diversified conditions of different parts of tropical Africa. Among the methods for increasing agricultural and pastoral production, the following may be noted :

(i) *The Improvement of Cultivation and Livestock Methods.* This, perhaps the most important and at the same time the most obvious of them all, might result in the elimination of shifting cultivation, the intensification of bush-fallowing methods, greater attention to breeding, and the prevention of soil erosion. Each of these, it should be noted, raises important questions—the basis of existing agricultural methods and their relation to sociological as well as to physical and economic conditions ; the cost of improvements, which might sometimes seem to be prohibitive ; the necessity for general education and for agricultural extension work on an unprecedented scale ; the problems of industrialization, e.g. of establishing chemical fertilizer factories ; and many others.

(ii) *The Provision of Improved Water Supplies.* Water for the irrigation of crops or for the watering of stock suggests many new prospects for increasing the productivity of dry areas, such as the Northern and Upper Regions of Ghana, the Accra plains, extensive areas in Northern Nigeria and in East Africa and much of the Sudan. Schemes may be small-scale and local or they may be large-scale and regional in their scope—such as the Gezira in the Sudan, the Niger Project in Mali, and the Limpopo Scheme in Mozambique.

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[18] *East Africa Royal Commission 1953-1955 Report,* p. 10.

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(iii) *Mechanization.* The possibilities of mechanization in African agriculture have been the subject of much enquiry and experiment during recent years. The purpose of mechanization in Africa is less to save labour than to extend the area under cultivation and thus to produce more food. There are many problems involved in the further use of agricultural machinery and many questions that are rightly being asked. Does the ploughing of large, continuous areas encourage soil erosion and delay the regeneration of vegetation ? Have the results so far justified, in economic and other terms, the heavy capital cost ? What of the political and sociological implications ? Ghana's State Farms offer particularly interesting illustrations of these new developments, though they have not been long established and information about them is far from complete. They are particularly designed to bring into cultivation new rather than already used areas, especially in the northern savannas ; but extensive clearances have also been undertaken under very different conditions in the forest zone of southern Ghana. Can it be argued that it is by these entirely new methods that increased productivity will be achieved, in much the same way as the Land-Rover has transformed the ease of movement in the African bush, and the bulldozer and the caterpillar tractor have revolutionized road-building in the tropics ? Britain, after all, had little machinery on her farms in 1939, yet today her agriculture is as highly mechanized as anyone's : and there are the examples of the agricultural revolutions in the U.S.S.R. and in China. On the other hand, there are special problems that face the machine in the tropics, especially in forested areas.

(iv) *The Introduction of New Crops or of New Breeds of Livestock.* Such possibilities must be considered, especially as Africa has always drawn considerably upon the resources of other parts of the world. Rice—at present a neglected cereal over much of tropical Africa—probably offers the best prospects : but any major new food crop involves changes in farming methods and changes of diet, to which the farmers themselves often show considerable resistance.

(v) *Improvement in the Handling, Storage, Marketing and Processing of Foodstuffs.* The general facts about excessive waste are incontrovertible, though little quantitative data are available. Much food is never harvested and is left to rot, particularly, perhaps, in forest country : this often appears to be the case quite near to large consuming markets. In Ghana it was estimated in 1959 that, for cereal crops kept in store for more than six months, over 20 per cent of the grain was destroyed or damaged by insect attack.[19] If a farmer could have the use of the whole of the harvested crop, he could either sell the surplus (at present lost to insects), to give him extra revenue, or he could grow a smaller acreage to give the same quantity as is available at present for human consumption. In northern Ghana it is

[19] J. Forsyth (1962), " Major Food Storage Problems ", pp. 394 - 401, in J. B. Wills (ed.), *Agriculture and Land Use in Ghana.*

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reckoned that the availability for human or cattle food of all the harvested crops could mean an end to the seasonal food shortages that now occur regularly every year.

In savanna areas it is suggested that much waste resulting from meat going bad very quickly would be eliminated by the establishment of carefully sited and well-organized canning factories. These would also cut out the lengthy journeys to which cattle are at present exposed, as a result of which they often arrive at the abattoirs of the towns where the meat-eating populations are concentrated in a very weak, emaciated condition. There are in fact many ways in which waste could be overcome or at least very considerably reduced, and it is suggested that if these problems were resolutely tackled there would be no real problem of food supplies, even in countries with rapidly growing urban populations or with increasingly large numbers of people engaged in non-agricultural activities.

It may be helpful to look at the population/food situation in a particular country, and as an example I take Ghana, for a variety of reasons. I spent the first three months of 1964 in the country (so that my first-hand experience is recent), and as I had lived for nearly a year in the Gold Coast as a member of the Ashanti Social Survey team in 1945/46,[20] I was able to compare the changing situation over a period of almost two decades. There is also a greater and probably more reliable volume of data available than for most countries in Africa, including recent official figures provided in the *Report* of the Seven-Year Development Plan.

A few years ago the PEP Report on *World Population and Resources*[21] stated quite categorically that there was in the Gold Coast " sufficient cultivable land to accommodate a much larger population ", growing root crops such as yams, sweet potatoes and cassava, as well as plantains in the wetter areas of the south and cereals in the drier northern areas. It noted the country as " an interesting example of a competent and stable Government in an under-developed country taking advantage of the very high price for one of its main products to strengthen the economy of the country permanently ":[22] it was " probably under-populated, in the sense that if population were larger the cost a head of supplying public utilities and public services would be lower ".[23] Today there are available many of the figures for the well-organized 1960 census and these can be compared with those of the 1948 count. The official increase of 2.6 millions in that period, from 4.1 to 6.7 millions, gives a growth of 63 per cent in the 12-year inter-censal period. Even those who believe that the 1948 census was an under-count must admit a quite consider-

[20] There is a report on the work of the Survey in M. Fortes, R. W. Steel and P. Ady, " Ashanti Survey, 1945/46 : an experiment in social research ", *Geographical Journal,* 110 (1947), pp. 149 - 79.

[21] Published by Political and Economic Planning, London 1955, p. 145.

[22] *Ibid.,* p. 146.

[23] *Ibid.,* p. 146.

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able increase of population. This increase, the *Report* suggests, is accounted for by 2.5 per cent natural increase and 0.5 per cent annual net migration. The urban population (i.e. those in localities with aggregate populations of 5,000 or more) increased from 16 per cent of the total population in 1948 to 23 per cent in 1960 : the latter figure represented 1.5 million people in 98 towns, 36 of which had 10,000 or more inhabitants. Accra had a population of 338,000, Kumasi 181,000, and Sekondi-Takoradi 75,000. Greater Accra already had 490,000 inhabitants, and with the incorporation of the new port of Tema is confidently expected to become a conurbation with perhaps as many as 1.25 million inhabitants within the next ten or fifteen years.

How far can—and does—Ghana satisfy its present food requirements and how far will it be able to do so in future ? Due note of this problem has been taken in the preparation of the Seven-Year Development Plan. The Report points out (p. 55) that in 1961 the country spent £G26m. on food imports, and that this will almost double (to £G50m.) by 1970, with the rate of economic growth anticipated, unless it is checked. Much has already been done towards increasing the country's food supplies and the achievement has been notable in several different directions. Thus towards the end of the Second World War it was remarkable how much army contractors were able to produce by scouring both the forest and the savanna areas and by providing the transport that brought food producers and food consumers together. (Is this process capable of much further development ? Current trends suggest that it may be, but can it go on indefinitely ?) One of the most striking changes that I noted between 1946 and 1964 was the great development in yam cultivation in northern Ashanti and parts of the Northern Region, with the consequent movement of large supplies to the great urban markets of the south. With the same stimulus, there has been a tremendous increase in maize, plantain and cocoyam production in the forest country, perhaps particularly in those cocoa areas whose cocoa has been devastated by swollen shoot. In the dry northern areas, dry-season gardens have been encouraged, although the quantity of foodstuffs produced is not particularly great (nevertheless it is by no means insignificant in an area with a marked " hungry season "), and one of the more successful crops is not a foodstuff, but tobacco which does, however, provide money with which food can be purchased.

The Seven-Year Plan (*Report,* p. 67) recommends an emphasis upon cereals, rather than plantains and root crops, on the grounds that cereals have more nutritional value, are more easily stored and transported and grow best in those parts of Ghana where it is most important to raise incomes and standards of living. Yields at present are very low (e.g. maize, 500 - 800 lb. per acre, cf. U.S.A. 3,000 lb.; rice, 800 lb., cf. 1,500 lb., with improved varieties under hillside cultivation, and over 3,000 lb. under swamp conditions). In part, it is hoped, protein deficiencies will be met by increased production of fish (including developments made possible by the creation of the Volta Lake), poultry and legumes (particularly groundnuts). It is recognized that there

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are many special problems of livestock production and that their solution may take many years. There are also plans for a very considerable extension of the acreage under fruit and vegetables and for increasing the production of numerous agricultural raw materials and export crops.

The policy for agricultural development is based on a concentration on a limited number of commodities, some of which will fill basic nutritional requirements like cereals and fish, while others will help to improve the balance of payments position, like cocoa or sugar ; a few, like rice, may do both. Such a programme would appear to be very sound, especially as it will encourage intensification of development in the hitherto neglected savanna areas, which might themselves become a farming region complementary in some measure to the cocoa-growing forest zone and to the rapidly expanding urban areas.

A great deal of this planning exists, of course, at the moment only on paper : some of the underlying ideas may be suspect, there may be considerable doubts about the feasibility of some developments proposed, and the ways and means of bringing the Plan to fruition may be either inadequate or altogether lacking. But it is undoubtedly a fair and reasonable assessment of the present position and succeeds in establishing the right priorities for future development. Certainly, it is more broadly based and more grandly conceived than some of the development programmes of pre-independence days.

A comprehensive plan of this nature may well result in the avoidance of food shortages in future years as population and urbanization increase. But perhaps Ghana is not particularly typical of the developing countries of tropical Africa today. It is comparatively wealthy, with a much wider range of products and a greater diversity of climatic and soil conditions than are found in most other parts of the continent. It has also had a fair experience of near, if not complete, self-government and there are, too, the prospects offered by the Volta Project. The position is likely to be very different in countries like Kenya, with already excessive crowding in the African Reserves of pre-independence days ; or Tanzania, with great tracts that seem almost uninhabitable interspersed with densely peopled and overstocked areas such as Sukumaland ; or Zambia, with the contrast between vast semi-arid and unproductive areas and the industrialized, urbanized and food-demanding Copperbelt ; or parts of the Northern Region of Nigeria, such as around Kano, where a very large district surrounding the city has to be cropped very heavily and intensively year after year to produce a reasonable supply of food for its large and growing population. (This last example, incidentally, shows what can be done if proper methods of farming are devised, but it also raises the question as to whether a food-producing area around a large centre of population can be continuously cropped and indefinitely extended.) There may indeed be many areas where the problems of population/food relationships are already more acute than in Ghana and where, potentially, they could be far more serious—especially if steps are not quite deliberately

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taken to survey the position and then to take the necessary action.

Geographers are readily involved in questions of this type because they study the nature of the physical environment and the limitations imposed by it upon economic development, and the distribution, density and future trends of population. But many other disciplines are also concerned with these problems ; most of us, indeed, have contributions to make to the assessment of their scale and to the discussion of the ways in which they can best be tackled in the various—and often very different—parts of tropical Africa.

DISCUSSION

In introducing his paper, PROFESSOR STEEL stressed the inter-disciplinary character of the subject and the need for co-operation between different disciplines in order to study problems such as those of population increase and food supply. In Africa there is not a general state of over population, for there are only limited areas of overcrowding. It might even be claimed that the main problem was under-population. In that case perhaps the chief problems were logistic, being mainly problems of supply. But the possibility of over-population was always there, and called for careful thought and planning on the part of all governments, in the future if not already.

MR. RIMMER raised the question of the comparability of different censuses in the same country and suggested that the evidence of the rate of population increase in, for example, Ghana was doubtful. Other speakers supported this view, notably DR. EHRLICH who referred to Kuczynski's work, and MISS HASWELL who drew attention to the very high infant mortality rates in West Africa. Evidence of overcrowding and population increase in many areas was not, however, wanting, according to MR. WILLETT, who pointed to the excessive demand for places in Nigerian schools not anticipated from the 1952-53 census ; according to PROFESSOR COLE, who thought large families less able to cope with economic problems ; and according to MR. GROVE, who compared the apparent high rates of population increase in Ghana and Nigeria.

The need for sample censuses in areas sufficiently small to permit reasonable accuracy and great variety of data was suggested by MR. GROVE and supported by MR. RIMMER, who described the technique in Ghana of following up the national census with sample control. PROFESSOR MORGAN complained of a waste of effort in compiling detailed statistics for small areas the boundaries and extent of which were not known. He suggested that census enumerators should record the boundaries of the areas in which they worked.

DR. EHRLICH criticised the over-use of the word 'subsistence' in references to African agriculture, and the argument that the answer to famine was to increase local 'subsistence' food production. Anything which encouraged subsistence rather than an exchange economy was a step backward. The real need was not necessarily for an increase in food production as such, but for an increase in production generally. He was supported by DR. W. B. MORGAN and by MISS HASWELL, who stressed the need to develop transport to give encouragement to all enterprises, whether governmental or individual, which could produce goods for export. She affirmed that income elasticity of demand for imports appears to be higher than that of many advanced economies. PROFESSOR FORDE thought the main problem in achieving economic growth was limited purchasing power.

PROFESSOR COLE drew attention to the need to improve livestock raising and to increase the production of animal protein. Crops integrated with livestock farming should be produced. Over-emphasis on the production of certain crops, such as maize and tobacco, had led to surpluses and/or vulnerability to the fluctuations of world market prices.

DR. KEAY took up a point made by Professor Steel that one should study the more densely populated areas of Africa because these were the danger spots. He suggested that in Northern Nigeria one might take a different view and study them as object lessons in the methods used by relatively primitive agriculturalists to produce sufficient food to feed themselves and a crop surplus for export.

PROFESSOR TUCKER asked whether an uncritical adoption of Western economic practices was the best policy for emergent Africa, bearing in mind President Johnson's recent admission of large-scale undernourishment in the United States—which had always

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been regarded as the ideal example of the Western system. MR. GLEAVE thought that in many areas the subsistence economy still existed, and that commercial agriculture was merely grafted on to it. He noted the mass exodus of population from rural areas to the towns where many remained unemployed, and thought it would be better for such people to return to agriculture and grow food than for African countries to have to import food. MR. KAY stressed the problems of custom and habit and thought there was a need for education and for a larger body of extension workers.

DR. ELKAN wondered whether the increased size of African families had upset the traditional arrangements for bringing young men and women into agriculture and had thus encouraged the exodus to the towns.

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